

Concept for High-Accuracy Temporo-Acoustic Anemometer for Improved Weather Model Accuracy

Pierre L. Coulomb
2026 May 25

An anemometer capable of determining with a degree of accuracy superior to current methods the average speed and direction of wind over an area of about 100 meters in diameter may be constructed using an ultrasonic emitter situated in a central location and a series of eight precisely-placed microphones linked to a modestly accurate precision clock, each of which are equidistant from the ultrasonic emitter.

The mechanism would measure the length of time required, factoring in the barometric pressure, for the acoustic energy to reach the sensors. The movement of air in a given direction will cause the sound to arrive sooner or later than it otherwise should.

This system would be advantageous for a number of reasons. For one, this mechanism would be less prone to mechanical failure than a standard anemometer which, because it relies upon a turbine, can become clogged or can be blocked. This mechanism would have no moving parts. More importantly, this proposed mechanism would provide an average over a larger area which even a series of distributed conventional anemometers could not. This average, when incorporated into a forecast model, would be inherently more useful than the type of data currently available and would lead to the creation of more accurate model output products.